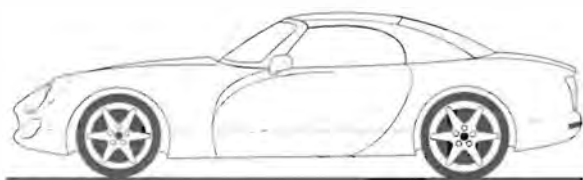




Service/Workshop Information

Introduction

Introduction



This Workshop/Service manual has been compiled for the **TVR Engineering** model - **Cerbera**.

Any modifications that do occur to the production car will be reflected in additional pages being sent out.

The aim of this workshop/service manual is assist skilled **TVR technicians** in the efficient repair and maintenance of any TVR Cerbera.

TVR do not accept any responsibility for any inaccuracies, errors or omissions contained within this manual, although every effort has been taken to make it as complete and accurate as possible.

TVR do not accept any liability for any consequential or other losses howsoever arising as a result of any of the recommendations contained within this manual.

All repairs to the TVR - Cerbera should be carried out by a TVR Dealer. Repairs should never be attempted by untrained individuals.

In this introductory section warnings, cautions and notes will appear in boxes to give more helpful information.

WARNING: These procedures must be followed accurately to avoid the accidents.

CAUTION: To ensure no damage occurs to any components these procedures must be followed.

NOTE: This calls attention to ways which make a job easier or gives helpful information.

Interpretation of Workshop Manual

This manual is divided into sections as shown on the contents page. To locate information referring to a general area of the vehicle, such as suspension, brakes, instrumentation, etc. use the main contents page. The general sections are split up further into sub sections, denoted by a number, so for example: C3, will describe an individual procedure in the Front Suspension section. Each of these individual procedures is listed at the start of each "lettered" main section.

Usage will quickly make the user familiar with the workshop manual layout, enabling efficient and effective use of the manual.

Dimensions

All dimensions stated in this manual are given in metric measurements, i.e. millimetres, litres, etc. unless otherwise stated.

Poisonous Substances

Many of the substances used on the Cerbera could cause physical harm and you must ensure they are kept away from open wounds.

Fuel Handling Precautions

The following section outlines information on handling fuel safety that shouldn't be ignored to ensure the utmost safety at all times.

The vapour that fuel creates is extremely flammable, toxic and explosive in confined areas. It produces around 150 times its own volume when it evaporates and when mixed with air it begins very ignitable. The vapour will always fall to the lowest level because it is heavier than air. This creates a problem because it is very easily distributed throughout a workshop so even the smallest of spillages could be dangerous. A fire extinguisher containing **FOAM CO2, GAS or POWDER** should always be close at hand when handling fuel.

WARNING: When a car is undergoing any work that involves the fuel system it is very important that the battery is disconnected before starting as arcing at the battery terminals may ignite any fuel vapour in the air.

All forms of ignition should therefore be extinguished before fuel system work commences and it should always be done by a TVR technician with fuel system training.

Hot Fuel Handling Precautions

WARNING: The listed procedures must be followed before any operation requiring fuel to be drained from the fuel tank is started.

1. Firstly, time should be allowed for the fuel to cool, avoiding contact with hot fuels.
2. The system should be vented during drainage by loosening the fuel filler cap, ensuring that a ventilated area is used when this operation is carried out. The filler cap should remain on.

Fuel Tank Repair

Under no circumstances should a repair to any fuel tank be attempted.

Used Engine Oil

WARNING: After lengthened and repeated contact with used engine oil the natural fats in the skin are eventually removed leading to dermatitis and other skin disorders.

Adequate means of skin protection and washing facilities should be provided as engine oil contains potentially harmful contaminants which may cause skin cancer.

Handling Precautions

1. Avoid lengthened and repeated contact with used engine oil.
2. Protective clothing, including impervious gloves

should be worn when handling used oil.

3. Avoid contaminating clothes, that are directly in contact with the skin.
 4. Immediate first aid treatment should be obtained in the event of oil coming in contact with open cuts or wounds.
 5. Do not wash the skin using gasoline, kerosene, diesel fuel, petrol, thinners or solvents.
 6. Where and when practical, degrease components before handling.
 7. Eye protection should be worn, e.g. goggles, or face shields, where there is a risk of eye contact.
- An eye wash facility should always be provided.

Disposing of Used Oils

When considering the disposal of used oil give due consideration to any adverse environmental effects it will have and dispose of it through authorised waste disposal contractors as it is illegal to pour used oil into the sewerage system, into waterways, or onto the ground.

If in doubt contact your local Environmental Health office for advice on disposal facilities.

Repairs & Replacements

When replacement parts are required it is essential that all parts are obtained from TVR Engineering. Attention is particularly drawn to the following points concerning repairs and the fitting of replacement parts and accessories: **safety features embodied in the vehicle may be impaired if parts, other than those specified by TVR Engineering are fitted.** In certain countries, legislation prohibits the use of parts not to the manufacturer's specification. Any torque wrench values given in the manual must be strictly adhered to. Locking devices where specified must be fitted, if any such device is impaired during removal it must be replaced with a new one. Certain fasteners must not be re-used.

How to Order

In order to avoid delay the following information should be read carefully and the instructions followed

carefully to ensure that the factory, importer or dealer receives sufficient information, in the approved form, to enable speedy dispatch of the correct parts. Orders for parts should be forwarded separately and not with correspondence dealing with other matters. The chassis number, vehicle identification number and engine number, including all letter prefix and suffixes of the car concerned must be quoted on every order. This information is given on the identification plate on the front panel of the vehicle and on the engine cylinder block. The full part number and description of the parts must always be given and, if any doubt exists, a sketch or pattern should be forwarded with the order. (For any special parts that are required and specific details, such as the part number are not known, please give as many details as possible on a separate sheet.)

Special Note

As pipe and hose lengths may vary from time to time due to variations in production build, please state length required in addition to the part number in order that we may supply the correct item. Always specify the dispatch method required e.g. Air freight, Airmail, sea, post, passenger train etc.

Confirmation orders must be clearly marked to avoid duplication. Crates and packing cases used for dispatch goods will be charged for and credited in full if returned undamaged within one month. Damaged and broken parts sent as patterns will not be returned unless specially requested.

General Technical Information

Differential

There are two types of differential. The HYDRATRAK is a sophisticated LSD that works basically by forcing fluid through small bleed orifices when one wheel tries to spin relative to the other. It does this though a series of small vane pumps in a similar manner to a vane compressor. Because of this it should be run in very carefully. The Cone diff is fundamentally similar to a Salisbury plate type diff and the same drawbacks apply. One oil will suffice for both types of diff - MOBIL SHC 80W - 140 ID. Any other oil will wreck the Hydratrak unit itself.

Running in the diff merely requires a gentle warming up of the unit and progressively more load over the course of about 500 miles. The Hydratrak unit will only be operational when there exists a difference in the wheel speed between the two output shafts and so this requires gentle cornering loads in order to bed the vanes in.

The output shafts of the diff do have a little play, this is quite normal. It is not unusual for the diff breather to vent a little oil at first. This is usually a sign of too much abuse too soon. Once it has breathed in this way the oil level will have found its own position and it should then be OK. It is a good idea to change the diff oil early on: the recommended change is at the 1000 mile service and then every 12000 miles. Be sure not to overfill the unit as this will exaggerate the breather problems. With respect to daily use both diffs should be quieter than the GKN unit, although the Hydratrak is a slightly more benign LSD with a less severe action.

With the Hydratrak there is some free play in the output shafts which is normal. The internal end of the shaft is centralised only when there is some torque passing through the unit.

Dampers

The dampers have been designed and built for the Cerbera in conjunction with an outside specialist. The springs are Eibach springs which are blue at the front and green at the rear. The car will always appear high at the rear when unladen due to the low spring rate and the change in axle loads when laden. There are also many varieties of bumpstops. This need not be a problem as long as the opposite hand is the same. The bushes are the same as the Griffith.

Brakes

These have been developed in conjunction with AP Racing and consist of alloy 4 piston front callipers and 291mm vented discs with 2 piston rear callipers and 306mm vented discs with integral rear drum handbrake. There is no balance valve. The front/rear split is controlled by the combination of disc, piston and pad size. The brakes do squeal from time to time the cause of which is being investigated by AP. The pad chamfers should be such that they contact the disc first. Along with the diff, the brakes should be gently run in. Only the demo cars have aeroquip hoses, the production cars have rubber hoses.

Chassis

The plates underneath are very important but for reasons of prop clearance etc they could be better. The front sump plate is made from either steel or alloy. If it is alloy there should be a pair of additional stainless steel reinforcing sections below the front anti roll bar mounts. Note that all the underside mounting bosses are 10 mm threads.

Rear Suspension

The rear suspension is fundamentally similar to the Griffith, the main differences being the wheel bearing and hub, the upright and driveshaft and the anti roll bar. The same methods of adjustment apply. If you are removing the bearing pack be careful with the length of the three mounting bolts, as if they are even 2mm too long they will interfere with the handbrake shoes. See drawings for bolt lengths.

Front Suspension

The front suspension however is completely different. The upright at present is machined from a billet of aluminium (C0169/0170) and has a brake calliper mounting bracket (J0162). Later cars will utilise a cast upright and will include integral mounting bosses so there will be no need for the bracket J0162. All of the uprights are dimensionally identical and have helicoil inserts where the steering arms etc bolt on. Again the bolt lengths are fairly critical so refer to the drawings. The steering arms, upper ball joint mountings, brake calliper brackets, and the lower drag struts are not handed.

The geometry is adjusted in the same manner as the Griffith and the car seems to be very sensitive to castor. The shims are the only current means of adjustment but we are intending using three different lengths of drag strut, suitably marked, so that the castor adjustment can be performed more easily and more accurately.

Wheels, Tyres and Steering

The wheels are the same front and rear but the tyres are not. The 225/45 x 16 front tyres are responsible for some of the sharp steering characteristics, but in the main the very light and quick rack is the cause; you will get used to it. There are a few other details regarding the rack. You cannot centralise the steering wheel at the boss. It must be done at one of the UJ splines. If the rack itself is not central relative to the car (ie. equal travel in each direction) then it is possible for the tyres to foul the upper wishbone on full lock. It is intended to utilise the latest Bridgestone tyre, the 502 as and when it becomes available. The front size remains the same but the rear will become 245/45x16. Do not fit different tyres or sizes on the same axle.

Due to the coarseness of the splines the ultimate centralisation of the steering wheel may be achieved by shuffling of the rack bar, but this should be limited to no more than $\frac{1}{2}$ turn of each track rod. Some of the racks seem to have a tight spot just to each side of the straight ahead position. We suggest leaving the adjustment for a few hundred miles as they do wear in.

GEOMETRY SETTINGS

Parameter	Front	Rear
CAMBER (DEG)	0.5 - 1.25 NEG	0.5 - 1.25 NEG(0.25)
CASTER(DEG)	3.5 - 4.5 POS	N/A (0.25)
TOE(MINS)	10 - 20 IN	10 - 20 IN (5)
TYRE PRESSURE	22 - 26	24 - 28(2)

NOTE: The toe figures are **TOTAL** for the axle in question, i.e. for a **PAIR** of wheels. The above figures represent acceptable tolerances. The maximum discrepancy from to side on the axle in question should be no more than the figures shown in brackets. In an ideal world the Cerbera would be aligned at the intended ride height, however, unless it is always to be used with 4 people it will be acceptable to use a passengerless car with at least half a tank of fuel. The greater tyre pressure range is aimed at continued high speed use (above 100 mph).



Service Requirements & Regular Checks

Recommended Lubricants & Fluids

Engine Oil Type	Change After	
Delvac 10W30	1000 miles (1600 km)	First fill from factory
Super 15W40	6000 miles (10000 km)	Second fill
Mobil 1 0W40	6000 miles (10000 km)	Regular Service (or 12 months)

Gearbox

Mobil SHC ATF

Differential

Mobil SHC 80W 140 ID

Cooling System

Mobil Universal Antifreeze

Brakes and Clutch

Mobil Universal Brake and Clutch Fluid SAE J1703

C.V. Joints

Mobil Grease Special NLGI 2

Power Steering (where fitted)

Mobil ATF 220

NOTE : TVR use and recommend Mobil products. Failure to use these products could effect vehicle performance and reliability and may also invalidate the warranty.

Weekly Checks

1. All exterior lights.
2. Oil level.
3. Coolant level.
4. Brake fluid level.
5. Power steering fluid.
6. Windscreen washer bottle.
7. Tyre pressures.
8. Visual check for any fluid leaks.

If for any reason the vehicle is grounded or an object strikes the chassis from below, it is advisable to visually inspect the chassis for signs of damage. If there is damage, the vehicle should be taken to your local dealer for a thorough inspection.

Service Intervals

The following are recommended service intervals for the vehicle.

1000 miles
6000 miles
12000 miles
18000 miles
24000 miles
30000 miles

and every 6000 miles thereafter or every twelve months, which ever is reached first.

NOTE : All service work should be carried out by a TVR factory approved service centre.

General repair procedures

Services by TVR dealers should be carried out at the intervals listed above and everything listed on the service schedules should be checked. (every 6000 miles or 12 months).

The following pages give details of some of the things that should be checked and replaced, and the recommended procedures used to perform the service. The rest of this manual goes into more depth and will act as a workshop/service manual.

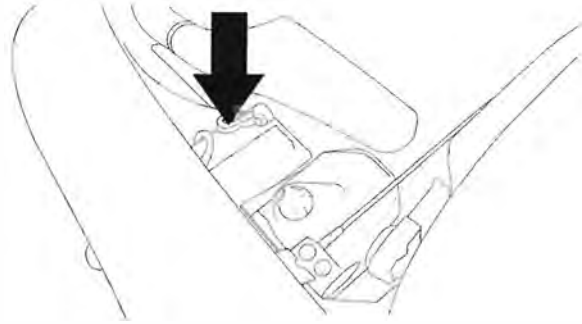
1. *Cooling System Reservoir*
2. *Battery*
3. *Engine Oil Filler Cap*
4. *Windscreen Washer Reservoir*
5. *Power Steering Fluid*
6. *Brake Fluid Reservoir*
7. *Engine Oil Dipstick*

1. Cooling System

The coolant level is visible through the transparent sides of the expansion tank. When the engine is cold, the coolant level should be at the MAX mark which is indicated by the seam on the side of the tank. When the engine is at its operating temperature, it is normal for the coolant level to rise above the MAX level. -fig 1



-fig 1



- fig 2

NOTE : Do not remove the blue pressure cap on the expansion tank if the engine is hot. Always check the coolant level when the engine is cold. If for any reason the cooling system needs the addition of a large quantity of coolant (i.e. after draining or major leak) then the system must be carefully bled.

With the heater control set to hot, fill the system through the expansion tank. Then full loosen the large brass screw on radiator. Air will be expelled - tighten the plug when water without air bubbles is expelled. Loosen the bleed screws on both the passenger side and driver side coolant rails. These are located between the black air boxes and the camshaft covers. Once again air will be expelled. Re-tighten the bleed screws when water without air bubbles is expelled. Start the engine and run at fast idle (1500 rpm) with the blue pressure cap off and continue to add coolant through the expansion tank. Rebleed radiator and coolant rails before the engine gets too hot. When the thermostat opens more coolant will need to be added. When no more coolant can be added replace the blue pressure cap. Let the engine run for a few more minutes until the fan cuts in and switch off the engine. Should the temperature gauge enter the 100° section before the fan cuts in stop and allow to cool. When the engine has cooled and no pressure can be felt in the radiator hoses remove the blue pressure cap and top up to the MAX level indicated on the side of the expansion tank. Then rebleed radiator and rails, the system is now full.

Note: Check the coolant level every week.

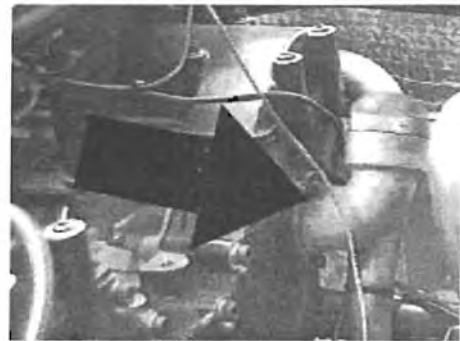
2. Battery

Located under the bonnet on the passenger side inner wheel arch. Should the battery need recharging please follow the instructions given in *Charging the Battery*.

- fig 2

3. Engine Oil Filler Cap

To remove, unscrew the cap in an anti clockwise direction and top up with TVR recommended oil if required tighten completely. (See *Recommended Lubricants and Fluids*)-fig3



-fig3

4. Windscreen Washer Filler Reservoir

Refill with a mixture of clean water and windscreen washer fluid. (Mixture as per manufactures instructions) -fig 3B



-fig 3B

5. Power Steering Reservoir

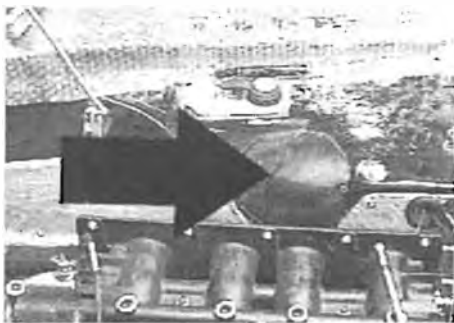
Remove the reservoir cap/dipstick. Check the fluid level when the car is cold. The level should be between the top mark on the dipstick and the bottom of the dipstick. Only top up with TVR recommended fluid (*Recommended Lubricants and Fluids*).-fig 4



-fig 4

6. Clutch Fluid Reservoir

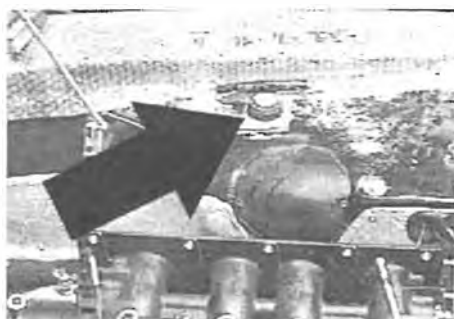
Located under the engine bay trim panel on the o/s of the bay. The clutch fluid reservoir cover will then need to be removed. Check that the fluid level is up to the MAX line on the reservoir and reseal the cover. Only top up with TVR recommended fluid, (*Recommended Lubricants and Fluids*).-fig 5



-fig 5

7. Brake Fluid Reservoir

Check that the fluid level is up to the MAX line on the reservoir. the warning light on the dash will come on if low and with the handbrake on. Only top up with TVR recommended fluid, (*Recommended Lubricants and Fluids*).-fig 6



-fig 6

8. Engine Oil Dipstick

The oil should always be checked on level ground with the engine switched off. Let the oil settle (5 minutes) then pull the dip stick out and wipe clean to ensure a true reading. Re-insert the dip stick and remove once again. The level of oil should read between the *min* and *max* marks on the dipstick. -fig 7 Ensure it is fully seated and do not knock off injector plug.



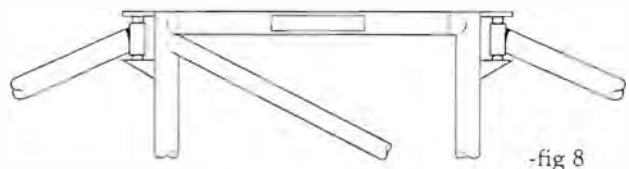
-fig 7

NOTE : Over filling may cause oil wastage. Running the engine with an oil level below the minimum mark could result in considerable damage being caused.

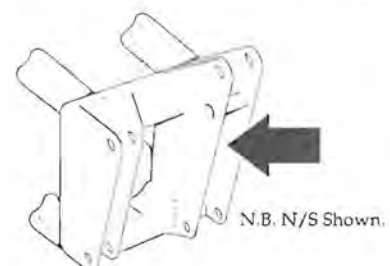
Vehicle Identification numbers (VIN's)

1. Locating The Chassis Number

The Cerbera chassis number is positioned in the engine bay on either the front cross member (early cars) or inside the O/S front wishbone mount. -fig 8



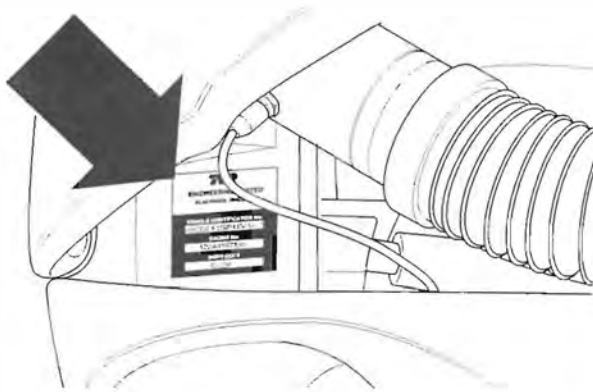
-fig 8



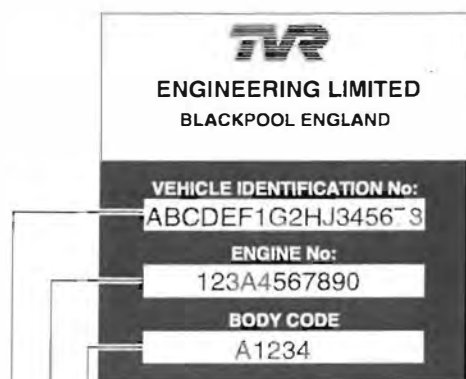
2. Locating The VIN Plate

To find out or check any of the vehicle identification numbers the VIN plate must be located.

The VIN plate is located in the engine bay of the Cerbera, and is only visible when the bonnet is fully open (resting on it's support). The actual position of the VIN plate is at the front of the engine bay on the near-side of the car
-fig 9



-fig 9



The Body Code gives the car's paint specification details. It begins with a letter followed by four numbers.
The Engine no. is an 11 figure code, also consisting of both letters & numbers.
The VIN no. is an 17 figure code consisting of both letters & numbers.

3. Reading The VIN Plate

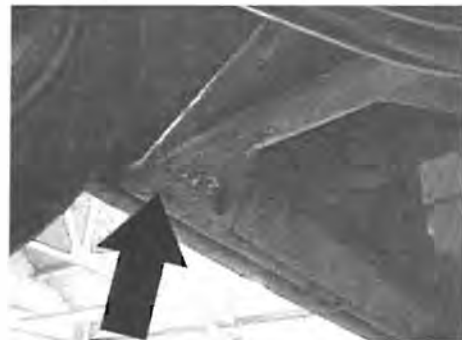
The VIN plate is produced in a standard format for the range of TVR vehicles. The diagram opposite shows the plate and the location of specific identification numbers.

Jacking Procedure

Before commencing with the instructions below the car must be raised off the ground.

1. To Raise Front Wheels:

1. The surface must be a solid ground surface.
2. Ensure that the hand brake is on.
3. Ensure that the jacking device is positioned only under one of the chassis tubes and not under any part of the floor pan or body. The recommended area for positioning the jack is between the two front wheels of the car, on either the crossmember that the towing eye is located on, or the crossmember behind it.
4. Proceed with raising the vehicle.
5. Insert axle stands. These should be positioned behind the front wheels - fig10



- fig10

2. To Raise Rear Wheels:

1. Use a solid, level ground surface.
2. Ensure that the front wheels are securely chocked.
3. Ensure that the jacking device is positioned only under one of the chassis tubes as close to the main chassis rail as possible and not under any part of the floor pan or body.

4. Proceed with raising the vehicle.
5. Insert axle stands. These should be positioned in front of the back wheels on the chassis tube.
- fig11



- fig11

CAUTION: It is essential that jacks and axle stands are positioned under the chassis to avoid damaging the body e.t.c. Do not position jacks or axle stands under the fibre glass body structure or floor pan, this will cause damage, and would also be extremely unsafe.

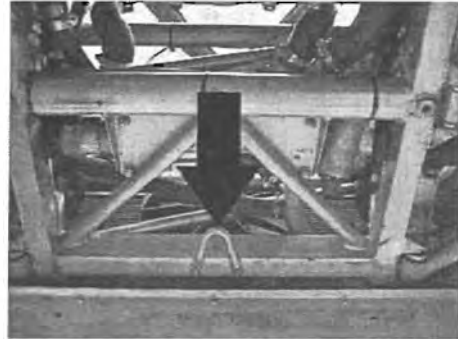
Jacks or axle stands must be positioned only on the areas shown above and over page.

CAUTION: Work should never be started until suitable axle stands have been positioned in the indicated positions.

Towing Procedure

The TVR Cerbera is not designed to tow other vehicles and for this reason there is no towing eye on the rear of the car. In the case of a break down there is a towing eye on the front of the car (- fig12) by which it is possible to tow the car to an appropriate place for repair, however it is not recommended that this distance be too great.

CAUTION: Please noted the brake servos and power steering will not be operative whilst the car is not running thus greater pressure will have to be applied to the brake pedal and greater effort will be needed to turn the steering wheel.



- fig12

Transporting by Trailer

When transporting the Cerbera by trailer or by a flat-bed transporter etc. it is crucial to secure the Cerbera to the trailer using the correct points on the car.

CAUTION : If the correct fastening points are not used the vehicle will be unsafe during transit, and parts of the Cerbera may also be damaged due to abnormal stresses.

4. Jump Starting / Battery Charging

It is now possible to jump start the car, or place the battery on charge. Both of these procedures are explained in the following sections:

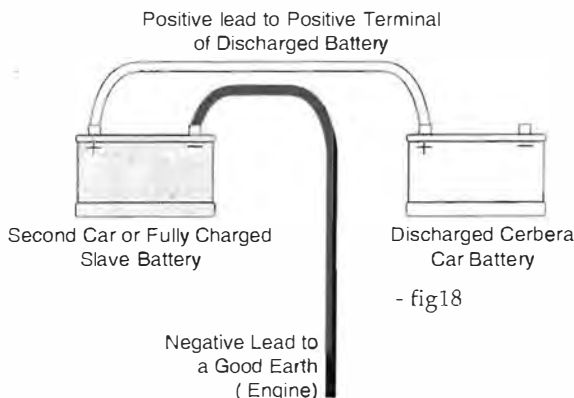
Jump Starting

Battery Charging Procedure

NOTE : When the discharged Cerbera battery is connected to a slave battery or charger the alarm and immobiliser will activate. Follow standard alarm deactivation procedure outlined in the Cerbera Handbook to deactivate the alarm and immobiliser.

Jump starting procedure

To jump start the Cerbera the following procedure should be followed:



1. The vehicles must be parked so that the jump leads will reach both batteries, alternatively a fully charged booster battery may be placed on the floor adjacent to the vehicle.
2. After checking that the ignition and any other electrical accessories are switched off, and that the car is in neutral with the parking brake applied, connect the leads as follows:

- A) One end of the first jumper cable connect to the positive (+) terminal of the booster battery.
- B) The other end of the first jumper cable connect to the positive (+) terminal of the discharged battery. (This is the only terminal that is accessible whilst the battery remains in the Cerbera).

- C) Connect one end of the second cable to the negative terminal of the booster battery.

- D) Connect the other end of the second jumper cable to the engine to create the negative connection.

WARNING: The final cable connection could cause arcing at the connection point, which if near battery could cause an explosion.

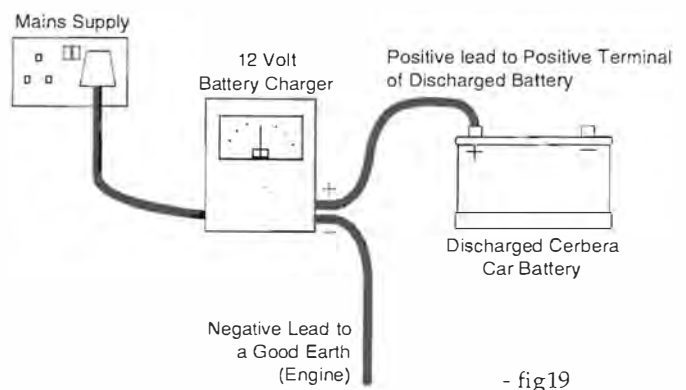
Continued ...

- 3) If the booster battery is connected to another vehicle start the engine and allow it to idle.
- 4) Start the engine of the Cerbera using the normal procedure.
- 5) Remove negative (-) jumper cable.
- 6) Finally remove the positive (+) jumper cable from positive terminals of both the booster battery and discharged battery, ensuring that the ends do not touch the negative terminals and create a short circuit.

NOTE : To avoid having to perform this procedure again it is advised not to turn the engine off until a sufficient charge has been built up in the battery to allow the car to be started under it's own power, or until the vehicle is in a position where it is possible to fully charge the battery from a mains charger.

Charging the battery

To charge the battery the procedure for connection of the leads is similar to that of jump starting, it is as follows.



WARNING : During the charging process Hydrogen and Oxygen gases are produced. This gas mixture can explode if flames sparks or lighted tobacco are brought near the battery. For this reason it is essential that the charging area is well ventilated, thus avoiding the gases to become concentrated.

NOTE: The charger should be switched off during all connection and disconnection procedures.

- 1) Ensuring that the charger is off, connect the positive (+) cable (normally coloured red) to the positive terminal of the battery (This is the only terminal that is accessible whilst the battery remains in the Cerbera).
- 2) Connect the negative (-) cable (normally coloured black) to the engine as indicated in the diagram.
- 3) Switch on the charger, and charge until the battery is fully charged. (As per the charger's instructions).

CAUTION : If charging the battery whilst it is still connected to the car a trickle charger giving out no more than 7 amps must be used as a larger amp charger will cause damage to other components.

- 4) Once the battery is charged, switch off the charger and disconnect the leads.

CAUTION : Over charging the battery may cause permanent damage, and effect it's reliability.

Cleaning Recommendations

Exterior Cleaning

By Hand.

The body work can be washed using a mild detergent or specialist car shampoo. A low pressure hose pipe should be used to rinse the vehicle. Specialised cleaners should not be used when cleaning the road wheels.

Using a power wash.

Power washing the bodywork is quite acceptable. However, do not spray the high pressure jet directly at the paintwork, or the door/window seals.

Automatic car wash

The use of automatic car washes is not recommended as the door/window seals are not designed to withstand the direct force of high pressure water jets. Also, the detergents used and the cleaning action of the brushes may damage the paintwork.

Interior Cleaning

Vinyl/Leather

Vinyl and leather should be cleaned with a damp cloth. However, a little mild detergent or proprietary upholstery cleaner may be required to remove ingrained marks. Leather upholstery will benefit from a periodical application of Hide Food.

CAUTION: Care should be taken when cleaning the steering wheel, gear lever or pedals, as most cleaning products will leave a slightly slippery surface layer which can be extremely dangerous during driving.

Carpets

Carpets should be cleaned regularly with a vacuum cleaner to remove dust and dirt. Mild detergents and warm water may be required to remove any difficult marks or stains.

Engine Bay Cleaning

Cleaning the engine bay should be done by hand. A Power or Jet washer **MUST NOT** be used. It must be ensured that water is not sprayed or poured directly on to any electrical equipment or connection. If this is allowed to happen damage may be caused to the cars electrical circuits, leading to break downs, and expensive repairs. This applies particularly to the throttle potentiometers, lambda sensors and crank sensors. If such connectors become damp spray with a moisture repellent e.g. Mech. oil etc.

TVR Approved Cleaners

TVR use the "Autosmart" line of cleaning products during the manufacture and maintenance of the cars and recommend their range of products. For a current list of "Autosmart" products and stockists, contact: